

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

TEST BOOKLET

Sl. No. 00213

Subject Code : 26

Subject : Statistics

LECTURERS FOR NON-GOVT. AIDED COLLEGES OF ODISHA

Time Allowed : 3 Hours

Maximum Marks : 165

: INSTRUCTIONS TO CANDIDATES :

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET CONTAINS 31 PAGES AND DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. You have to enter your **Roll No.** on the Test Booklet in the Box provided alongside. **DO NOT** write anything else on the Test Booklet. 

--	--	--	--	--	--	--	--	--	--
3. The Test Booklet contains **165** questions. Each question comprises four answers. You have to select the correct answer which you want to mark (darken) on the Answer Sheet. In case, you feel that there is more than one correct answer, you should mark (darken) the answer which you consider the best. In any case choose **ONLY ONE** answer for each question. If more than one answer is darkened it will be considered as wrong.
4. You have to mark (darken) all your answers **ONLY** on the **separate OMR Answer Sheet** provided, by using **BLACK BALL POINT PEN**. You have to do rough work on the space provided in the Test Booklet only. See instruction in the Answer Sheet.
5. All questions carry equal marks, i.e. of one mark for each correct answer and each wrong answer will result in negative marking of **0.25** mark.
6. Before you proceed to mark (darken) in the Answer Sheet the answers to various questions in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per the instructions in your Admit Card.
7. After you have completed filling in all your answers on the Answer Sheet and after completion of the examination, you should hand over to the Invigilator the **Original Answer Sheet (OMR Answer Sheet)** issued to you. You are allowed to take with you the candidate's copy/second page of the Answer Sheet along with the Test Booklet after completion of the examination for your reference.

Candidate's full signature

Invigilator's signature

RS – 19/30

(Turn over)

2018

SEAL

1. Joint probability of Independent events J and K is equal to :
- (A)  $P(J) * P(K)$   
 (B)  $P(J) + P(K)$   
 (C)  $P(J) * P(K) + P(J - K)$   
 (D)  $P(J) * P(K) - P(J * K)$
2. What is the marginal probability of dependent events and independent events ?
- (A) One  
 (B) Different  
 (C) Same  
 (D) All of these
3. When we throw 2 dice then what is the probability of getting a sum 9 ?
- (A)  $2/9$   
 (B)  $1/9$   
 (C)  $1/12$   
 (D)  $1/3$
4. Two dice are thrown simultaneously what is the probability of getting 2 numbers whose product is even ?
- (A)  $3/4$   
 (B)  $1/4$   
 (C)  $7/4$   
 (D)  $1/2$
5. A box contains 20 electric bulbs, out of which 4 are defective. Two bulbs are chosen at random from this box. The probability, that at least one of these is defective, is :
- (A)  $7/19$   
 (B)  $6/19$   
 (C)  $5/19$   
 (D)  $4/19$
6. A box contains 5 green, 4 yellow and 3 white balls. 3 balls are drawn at random. What is the probability that they are not of same colour ?
- (A)  $52/55$   
 (B)  $3/55$   
 (C)  $41/44$   
 (D)  $3/44$
7. At a high school with 200 students, 32 play soccer, 18 play basket ball and 8 play both sports. If a student is selected at random, find the probability that a student plays soccer or basket ball :
- (A)  $71/100$   
 (B)  $1/4$   
 (C)  $4/25$   
 (D)  $1/5$

8. The probability that a family visits city museum is 0.36. and the probability that a family rides on the 3 rivers ferry is 0.47. The probability that a family does both is 0.22. Find the probability that the family visits the museum or rides the ferry.
- (A) 0.83  
 (B) 0.61  
 (C) 0.58  
 (D) 0.69
9. All values in sample distribution that can freely varies in selected random sample from population are indicated as :
- (A) Degrees of freedom  
 (B) Degrees of error  
 (C) Degrees of statistic  
 (D) Degrees of possibility
10. You draw successive random samples of nine participants from a population, calculate the mean of each sample, and plot the sample means. If the population has a mean of 12 and a s.d of 6, the s. d of your distribution is :
- (A) 4  
 (B) 3  
 (C) Can not be determined  
 (D) 2
11. The Central limit theorem tells us that as sample size increases the sampling distribution of the mean becomes :
- (A) Less normally distributed but more leptokurtic  
 (B) More normally distributed with a larger range of scores  
 (C) More shaped like the population distribution  
 (D) More normally distributed with a smaller range of scores
12. At a computer manufacturing company, the actual size of computer chips is normally distributed with a mean of 1 centimeter and a s.d. of 0.1 centimeter. A random sample of 12 computer chips is taken. Above what value do 2.5% of the sample means fall ?
- (A) 1.96  
 (B) 1.0163  
 (C) 1.1960  
 (D) 1.0566

13. The average score of all Pro-golfers for a particular course has a mean of 70 and a s. d. of 3. Suppose 36 golfers played the course today. Find the probability that the average score of the 36 golfers exceed 71 ?
- (A) 0.00  
 (B) 0.3694  
 (C) 0.0228  
 (D) Information Insufficient
14. A Basket ball player makes 80% of his free throws during the season. What is the probability that he will make exactly 6 of his next 8 free throws ?
- (A) 0.1468  
 (B) 0.3355  
 (C) 0.1678  
 (D) 0.2936
15. Given  $x = 2$  and  $f(x) = 0.5$ . If  $y = 2x - 3$ , then  $f(y)$  is equal to :
- (A) 1  
 (B) 0.5  
 (C) -2  
 (D) 0
16. If  $\text{Var}(x) = 5$  and  $V(y) = 10$ , then  $v(2x + y)$  is :
- (A) 15  
 (B) 20  
 (C) 10  
 (D) 30
17. The distribution function  $F(x)$  is equal to :
- (A)  $P(X = x)$   
 (B)  $P(X \leq x)$   
 (C)  $P(X \geq x)$   
 (D) All of these
18. What would be the probability of an event 'G'. If H denotes its complement, according to the axioms of probability ?
- (A)  $P(G) = 1/P(H)$   
 (B)  $P(G) = 1 - P(H)$   
 (C)  $P(G) = 1 + P(H)$   
 (D)  $P(G) = P(H)$
19. If A and B are 2 events then the probability of exactly one of them occurs is given by :
- (A)  $P(A \cap \bar{B}) + P(\bar{A} \cap B)$   
 (B)  $P(A) + P(B) - 2P(A)P(B)$   
 (C)  $P(\bar{A}) + P(\bar{B}) - 2P(\bar{A})P(\bar{B})$   
 (D)  $P(A) + P(B) - P(A \cap B)$

20. A survey determines that in a locality, 33% go to work by bike, 42% go by car, and 12% use both. The probability that a random person selected uses neither of them is :
- (A) 0.29  
 (B) 0.37  
 (C) 0.61  
 (D) 0.75
21. Husband and wife apply for 2 vacant spots in a Company. If the probability of wife getting selected and husband getting selected are  $\frac{3}{7}$  and  $\frac{2}{3}$  respectively. What is the probability that neither of them will be selected ?
- (A)  $\frac{2}{7}$   
 (B)  $\frac{5}{7}$   
 (C)  $\frac{4}{21}$   
 (D)  $\frac{17}{21}$
22. An Urn  $B_1$  contains 2 white and 3 black chips and another Urn  $B_2$  contains 3 white and 4 black chips. One Urn is selected at random and a chip is drawn from it, if the chip drawn is found black, find the probability that the Urn chosen was  $B_1$  :
- (A)  $\frac{4}{7}$   
 (B)  $\frac{3}{7}$   
 (C)  $\frac{20}{41}$   
 (D)  $\frac{21}{41}$
23. At a certain university, 4% of men are over 6 feet tall and 1% of women are over 6 feet tall. The total student population is divided in the ratio 3 : 2 in favour of women. If a student is selected at random from among all those over 6 feet tall, what is the probability that the student is a women ?
- (A)  $\frac{2}{5}$   
 (B)  $\frac{3}{5}$   
 (C)  $\frac{3}{11}$   
 (D)  $\frac{1}{100}$
24. What does the law of large numbers mean ?
- (A) The more you try, the more likely you are to get what you want  
 (B) No matter how many times you try, the probability remains the same  
 (C) Trying harder is a good idea  
 (D) Running for a long time

25. If you are spinning a colour wheel with seven colours on it and you have 100 spins to get a red. After 99 spins you have gotten every color but red. What is the chance you will spin a red on the 100<sup>th</sup> spin ?

- (A) 1
- (B) 1 / 100
- (C) 6 / 7
- (D) 1 / 7

26. If you are stranded on a desert and you can't get off until you roll a six on a die, how many rolls will you ask for ?

- (A) 6
- (B) 1
- (C) 23
- (D) Infinite

27. What would be the joint probability of statistically independent events that occur simultaneously ?

- (A) Zero
- (B) Not equal to zero

- (C) Infinite
- (D) Consistent

28. The conditional distribution of y given  $X = x$ ,  $P(Y = y/X = x)$  is :

(A)  $\frac{P(Y = y)}{P(X = x)}$

(B)  $\sum_{i=1}^{\ell} P(X = x_i, Y = y)$

(C)  $\frac{P(X = x, Y = y)}{P(Y = y)}$

(D)  $\frac{P(X = x, Y = y)}{P(X = x)}$

29. The conditional expectation of Y given X,  $E(Y/X = x)$  is calculated as follows :

(A)  $\sum_{i=1}^k y_i P(X = x_i / Y = y)$

(B)  $E\{E(Y/X)\}$

(C)  $\sum_{i=1}^k y_i P(Y = y_i / X = x)$

(D)  $\sum_{i=1}^{\ell} E(Y / X = x_i) P(X = x_i)$

30. Two random variables X and Y are independently distributed if all of the following conditions hold with the exception of :

- (A)  $P(Y = y / X = x) = P(Y = y)$
- (B)  $E(Y) = E[E(Y/X)]$
- (C) Knowing the value of one of the variables provides no information about the other
- (D) If the conditional distribution of Y/X equals to the marginal distribution of Y

31. If the Joint p. d. f. of two random variables X and Y is defined as :

$$f(x, y) = \begin{cases} x+y & \text{for } 0 \leq x \leq 1, 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

then the marginal distribution of X is :

- (A)  $f_X(x) = x + 1/4$
- (B)  $f_X(x) = (x + y + 1)$
- (C)  $f_X(x) = x + 1/2$
- (D)  $f_X(x) = x + \frac{3}{16}$

32. The relations of cumulative distribution function with J. p. d. f,  $f(x, y)$  of 2 dimensional random variables X and Y is :

- (A)  $F(x, y) = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f(x, y) dx dy$
- (B)  $F(x, y) = \int_0^{\infty} \int_0^{\infty} f(x, y) dx dy$

$$(C) F(x, y) = \int_{-\infty}^x \int_{-\infty}^y f(x, y) dx dy$$

$$(D) F(x, y) = \int_{-\infty}^x \int_{-\infty}^y f(x, y) dx dy$$

33. The (1, 1)th central moment for the joint p. d. f.  $f(x, y) = 3 - x - y$  for  $0 \leq x, y \leq 1$  is :

- (A)  $\mu_{1,1} = -1/4$
- (B)  $\mu_{1,1} = 1/12$
- (C)  $\mu_{1,1} = 0$
- (D)  $\mu_{1,1} = \frac{1}{24}$

34. A man rolls a fair die again and again until he obtains a 5 or 6. Calculate the probability that he will require 5 throws :

- (A) 16/243
- (B) 15/243
- (C) 16/242
- (D) 15/240

35. A marker is to continue shooting at the target until he hits the target 6 times. The probability that he hits the target on any shooting is 0.4. What is the probability that the marker will have to shoot 9 times ?

- (A) 0.0593
- (B) 0.0495
- (C) 0.0415
- (D) 0.0413

36. If a Poisson variate  $X$  is such that  $P(x = 1) = P(x = 2)$ , what is  $P(x = 4)$  {given  $e^{-2} = 0.1353$ }:

- (A) 0.08
- (B) 0.082
- (C) 0.085
- (D) 0.09

37. The chances of a Bomber hitting the target and missing the target are 3 : 2. Calculate the probability that the target will be hit at least once in five sorties :

- (A)  $\frac{3093}{3125}$
- (B)  $\frac{3095}{3125}$
- (C)  $\frac{3098}{3125}$
- (D)  $\frac{3093}{3175}$

38. It has been found that as an average the number of mistakes per typed page of a typist is 1.5. Find the probability that there are 3 or less mistakes (given  $e^{-1.5} = 0.2231$ ) :

- (A) 0.9333
- (B) 0.9342
- (C) 0.9313
- (D) 0.9383

39. Cauchy Schwartz inequality states that if  $X$  and  $Y$  are two random variables taking real values then :

- (A)  $E[(XY)^2] \leq E(X^2) E(Y^2)$
- (B)  $E[(XY)^2] \leq E(X) E(Y)$
- (C)  $E[(XY)^3] \leq E(X^2) E(Y^2)$
- (D)  $E[(XY)^2] \geq E(X) \cdot E(Y)$

40. A machine produces 10% defective items. Ten items are selected at random. Find the probability of not more than two items being defective :

- (A)  $\left(\frac{24}{9}\right)\left(\frac{9}{10}\right)^8$
- (B)  $\frac{24}{9}\left(\frac{9}{10}\right)^5$
- (C)  $\frac{24}{9}\left(\frac{9}{10}\right)^9$
- (D)  $\frac{24}{9}\left(\frac{9}{10}\right)^{10}$